

# The Effect of Unconventional Fertilizers on the Growth and Development of Cotton

Ismailova Aksungul Uzakbaevna

Basic doctoral student of the Karakalpakstan Institute of Agriculture and Agrotechnologies,  
Nukus, Uzbekistan

**Abstract:** In order to study the effect of unconventional fertilizers (glauconite, glaucophos) on the growth and development of cotton in the saline soils of the Republic of Karakalpakstan, field experiments were conducted. As a result of the received information using unconventional fertilizers together with mineral fertilizers in feeding cotton is efficient in economic and ecological sides. At the same time, by reducing the annual norm of mineral fertilizers by 25% and replacing them with unconventional fertilizers, it will be possible to reduce the amount of mineral fertilizers in the soil, while fully satisfying the demand of cotton for micronutrients.

Feeding of unconventional fertilizers in the amount of 1200 kg / ha, including 600 kg / ha under plowing, 600 kg / ha during the growing season, application of mineral fertilizers in the amount of N190 P130 K90 kg / ha has been found to have a positive effect on good growth and development of cotton.

**Keywords:** mineral fertilizers, unconventional fertilizers, cotton, growth, development, saline soils, economic and environmental benefits, under plowing, feeding during the growing season.

---

**Introduction.** The task of agricultural production is to constantly increase agricultural production, improve its quality, processing and storage. In the cultivation of cotton requires an increase in yield based on the effective use of mineral fertilizers. It is well known that by applying optimal standards of mineral fertilizers to the soil, it is important to improve its condition, increase its fertility and productivity of agricultural crops.

In addition to nitrogen, phosphorus and potassium fertilizers, the use of fertilizers that improve plant growth, increase the efficiency of enzymes, accelerate photosynthesis, contain microelements (Fe, Cu, Cn, Mo, B, Zn, CO) allows to increase productivity, plant resistance to drought, cold and disease.

Of the crops grown in Karakalpakstan: cotton, rice, wheat and corn are sufficiently sensitive to the diet, the content of macro-and microelements. Therefore, regional scientific institutions are required to apply effective mineral fertilizers and develop new technologies for their production. Much attention is paid here to the problem of developing mineral fertilizers based on local natural raw materials. These include highly dispersed bentonite muds, glauconite, phosphorite, and others. They contain up to 15 trace elements. For our region, the use of glauconite sands as a direct fertilizer and the preparation of fertilizers containing micronutrients on their basis is of great economic importance, as the replacement of imported mineral fertilizers with local agro-ores can reduce their cost and reduce their application costs.

As a result non-application of crop rotation and organic fertilizers, the soil is saturated with salts of mineral fertilizers. Therefore, the reduction of mineral fertilizers and their replacement or joint application with local agro-ores is economically and environmentally relevant.

**Methodology of the experiment.** The field experiment was conducted in the central (Khujayli) soil-climatic region of the Republic of Karakalpakstan. The soils are meadow-alluvial, the

mechanical composition is average, groundwater is located at 1.5-2.0 m, saline.

It consists of defining the influence of the norms and timing of the application of glauconite and glaucophos from mineral and local unconventional fertilizers in the feeding of cotton on the growth, development and yield of cotton.

The following options were studied in the experiment: Option 1 (control) mineral fertilizers in the amount of N250 P175 K125 kg / ha, in options 2 and 3 glauconite and glaucophos 900 kg / ha without mineral fertilizers, in all of the other options the amount of mineral fertilizers is the same, i.e. N180 P130 K90 kg / ha, in options 4 and 5, NPK + glauconite and glaucophos in the amount of 600 kg / ha, in the 6<sup>th</sup> and 7<sup>th</sup> options NPK + glauconite and glaucophos in the amount of 900 kg / ha, in options 8 and 9 NPK + 1200 kg / ha and from this 600 kg / ha under plowing, in options 10 and 11 NPK + 1200 kg / ha and NPK + 1500 kg / ha glauconite and all under plowing, in options 12 and 13 NPK + glaucophos 1200 and 1500 kg / ha, all under plowing. The area of each variant was 192 m<sup>2</sup> (40x4.8 m), conducted in four repetitions. The total area of the experimented field was 1.7 ha. Field experience was conducted in accordance with the experimental system based on the manual "Methods of conducting field experiments" UzICSR. Tashkent. 2007.

As of August 1, the plant had grown well. The average plant height was 63.8-82.3 cm, and the number of fruitful branches was 6.7-9.1. In the control variant, where only mineral fertilizers were applied in the amount of N250 P175 K125 kg / ha, the plant height was 72.6 cm, the number of fruitful branches was 8.0 and the number of pods was 4.5. Glauconite and glaucophos from local non-conventional fertilizers were applied without mineral fertilizers in the amount of 900 kg / ha in options 2 and 3, respectively, 63.8-64.1; 6.7-6.8 and 3.4-3.5 units, which was lower than the control variant indicators. Due to the lack of macronutrients in these variants, the growth and development of cotton was unsatisfactory.

Reducing the annual rate of mineral fertilizers by 25% (N185 P130 K90 kg / ha), in addition to it applied glauconite and glaucophos in the amount of 600 and 900 kg / ha in variants 4-7, plant height was 75.6-77.8 cm, number of fruitful branches 8, 4-8.7 units and the number of cores was 4.6-5.0 units, which is more by 3.0-5.2 cm, 0.4-0.7 and 0.1-0.5 units, respectively, from the control variant. At the same time, the annual rate of mineral fertilizers was reduced by 25% and replaced by glauconite and glaucophos from local non-traditional fertilizers.

In 8 and 9 variants when mineral fertilizers were applied in the amount of N185 P130 K90 kg / ha and additional glauconite and glaucophos in the amount of 1200 kg / ha (600 kg / ha for plowing, 600 kg / ha for feeding) plant height was 80.1-82.3 cm, the number of fruitful branches was 9.0-9.1 and the number of pods was 5.4-5.6, which is more from the control variant by 7.3-9.7 cm, 1.0-1.1 and 0.9-1.1 units. Compared to the 47 variants used in combination with mineral and local non-traditional fertilizers, the plant height is more by 4.5 cm, the number of fruitful branches - 0.6-0.4, and the number of pods - 0.8-0.6.

In options 10-13 where mineral fertilizers N185 P130 K90 kg / ha and in addition glauconite and glaucophos were used in the amount of 1200 and 1500 kg / ha, while glauconite and glaucophos in the amount of 1200 and 1500 kg / ha applied under full plowing, plant height was 79.6-82,0 cm, the number of fruitful branches was 8.6-9.0, and the number of pods was 5.1-5.4. It was found that the indicators in these options were almost identical to the indicators in options 8 and 9.

Observations on September 1 showed that the height of the plant remained almost unchanged, but the number of fruitful branches and pods was higher than on August 1. In the control variant, where mineral fertilizers were applied in full (N250 P175 K125 kg / ha), the number of fruitful branches was 12.1 and the number of pods was 8.1. In variants 2 and 3, when glauconite and glaucophos were applied at a rate of 900 kg / ha from local unconventional fertilizers, the number of fruitful branches was 8.6-8.9 and the number of pods was 6.3-6.5, which is less by 3.5-3.2 pieces and the number of pods - 1.8-1.6 pieces compared to the control variant. In

variants 4-7 where mineral fertilizers N185 P130 K90 kg / ha and additional glauconite and glaucophos in the amount of 600 and 900 kg / ha were used the number of fruitful branches was 12.6-13.2 and the number of pods was 9.3-9.6, and it was more by 0.5-1.1 according to the number of fruitful branches and the number of pods - 0.8-1.5 comparing to the control variant.

In options 8 and 9 when mineral fertilizers N185 P130 K90 kg / ha and in addition glauconite and glaucophos in the amount of 1200 kg / ha (600 kg / ha under plowing, 600 kg / ha for feeding) were applied the number of fruitful branches was 13.5-13.8 and the number of pods was 10.1-10.6, compared to the control variant the number of fruitful branches was more by 1.4-1.7 and the number of pods - 2.0-2.5, it was defined that compared to the variants 4-7 where mineral and local non-traditional fertilizers were used together, the number of fruitful branches was more by 0.9-0.7 and the number of pods - 0.8-1.0.

In variants 10-13 where mineral fertilizers N185 P130 K90 kg / ha and in addition glauconite and glaucophos in the amount of 1200 and 1500 kg / ha were used (glauconite and glaucophos are given under full plowing) the number of fruitful branches was 13.0-13.5 and number of pods 9.7-10.2 pcs., compared to options 8 and 9, the number of fruitful branches was found to be 0.5-0.3 less and the number of pods to be 0.4 less.

#### Influence of applied mineral and local unconventional fertilizers on the growth and development of cotton

Order of options	1.VII		1.VIII			1.IX		
	The height of plant, cm	The number of fruitful branches, piece	The height of the main stem, cm	The number of fruitful branches, piece	The number of pods, piece	The height of the main stem, cm	The number of fruitful branches, piece	The number of pods, piece
1	45,6	5,0	72,6	8,0	4,5	73,0	12,1	8,1
2	40,3	4,8	64,1	6,7	3,4	65,0	8,9	6,3
3	42,8	5,0	63,8	6,8	3,5	64,0	8,6	6,5
4	50,3	6,1	75,6	8,4	4,6	76,0	12,8	9,5
5	48,6	5,8	77,8	8,4	4,7	78,0	13,2	9,6
6	49,5	6,0	76,5	8,7	4,8	77,0	12,6	9,3
7	51,5	6,0	77,3	8,5	5,0	77,0	13,1	9,4
8	52,0	6,3	80,1	9,1	5,4	80,0	13,5	10,1
9	51,6	6,3	82,3	9,0	5,6	82,5	13,8	10,6
10	49,5	5,9	79,6	8,6	5,2	80,0	13,2	9,7
11	48,1	5,8	81,3	8,7	5,1	81,0	13,0	9,8
12	48,6	5,6	80,6	9,0	5,3	81,0	13,5	10,1
13	49,2	5,3	82,0	8,9	5,4	82,5	13,5	10,2

It should be noted that the norm of mineral fertilizers in options 10-13 is the same as in options 8 and 9, local non-traditional fertilizers were applied under full plowing in the amount of 1200 and 1500 kg / ha.

**Conclusions.** For good growth and development of cotton it is expedient to apply mineral fertilizers N185 P130 K90 kg / ha and additional local non-traditional fertilizers glauconite and glaucophos 1200 kg / ha, including glauconite and glaucophos 600 kg / ha under plowing and 600 kg / ha cotton during application for feeding and application of mineral fertilizers in the amount of N185 P130 K90 kg / ha in addition to glauconite and glaucophos in the amount of 1200 and 1500 kg / ha, respectively, transfer glauconite and glaucophos under full plowing.

#### References

1. Tungushova D.A., Belousov E.M., Abdurakhmanov S.O., Boltaev S. Effectiveness of application of non-traditional agronomic ore in cotton complex. // Scientific and practical basis for increasing soil fertility. Materials of the International Conference. Part 1. Tashkent. - 2007. -p. 112-115
2. Ayimbetov N., Bauatdinov S., Bauatdinov T. Scientific basics of applying glauconites of



Karakalpakstan. -Nukus. -Science. -2016. –p. 242.

3. Ismailova A. Influence of mineral agro ores on cotton yield. -Nukus. -Miraziz Nukus. - 2018. –p. 68.
4. Ismailov U.E. and others. Effectiveness of application of local mineral fertilizers in the conditions of saline lands of Karakalpakstan. -Nukus. -Miraziz-Nukus. -2017. –p. 88.